AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) A method for offset time tracking in a non-negligible multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system, the antenna diversity system comprising a plurality of antennas each transmitting a modulated signal;

demodulating a first modulated signal of the plurality of modulated signals into a first demodulated signal in response to a first offset, a first data despreading sequence, and a first pilot estimate, wherein the first modulated signal is from a first transmit antenna from the plurality of antennas;

demodulating a second modulated signal of the plurality of modulated signals into a second demodulated signal in response to a second offset, a second data despreading sequence, and a second pilot estimate, wherein the second data despreading sequence is different from the first data despreading sequence, and wherein the second modulated signal is from a second transmit antenna from the plurality of antennas;

generating a first error signal for the first demodulated signal in response to sampling of a pilot signal, associated with the first modulated signal, a predetermined time prior to the first offset and a predetermined time subsequent to the first offset;

generating a second error signal for the second demodulated signal in response to sampling of a pilot signal, associated with the first modulated signal, a predetermined time prior to the second offset and a predetermined time subsequent to the second offset;

generating a first updated offset in response to the first time error signal; and

generating a second updated offset in response to the second time error signal.

2. (Original) The method of claim 1, further comprising combining the first demodulated signal and the second demodulated signal to form a combined signal that is substantially equivalent to the main data signal.

3. (Original) The method of claim 2, wherein the step of combining comprises demultiplexing the first and the second demodulated signals.

4. (Original) The method of claim 1, wherein the first and the second modulated signals are alternating portions of a main data signal.

5. (Original) The method of claim 1, wherein the first updated offset is generated with a first time tracking loop and the second updated offset is generated with a second time tracking loop.

6. (Original) The method of claim 1, further comprising demodulating further received signals using the first updated offset and the second updated offset.

7. (Currently Amended) A method for offset time tracking in a non-negligible multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system, the antenna diversity system comprising a plurality of antennas each transmitting a modulated signal from a plurality of modulated signals;

demodulating a first modulated signal of the plurality of modulated signals into a first demodulated signal using a first offset and a first data despreading sequence, wherein the first modulated signal is from a first transmit antenna from the plurality of antennas;

demodulating a second modulated signal of the plurality of modulated signals into a second demodulated signal using a second offset and a second data despreading sequence wherein the second data despreading sequence is different from the first data despreading sequence, and wherein the second modulated signal is from a second transmit antenna from the plurality of antennas;

determining a first energy magnitude of the first demodulated signal a predetermined time prior to the first offset;

determining a second energy magnitude of the first demodulated signal a predetermined time subsequent to the first offset;

generating a first error signal for the first demodulated signal in response to a difference between the first and the second energy magnitudes;

determining a third energy magnitude of the second demodulated signal a predetermined time prior to the second offset;

determining a fourth energy magnitude of the second demodulated signal a predetermined time subsequent to the second offset;

generating a second error signal for the second demodulated signal in response to a difference between the third and fourth energy magnitudes;

generating a first updated offset in response to the first error signal; and

generating a second updated offset in response to the second error signal.

8. (Original) The method of claim 7, wherein the predetermined time prior to the first offset is half a chip time and the predetermined time subsequent to the first offset is half a chip time.

9. (Original) The method of claim 7, further comprising combining the first and second demodulated signals into a single data signal by demultiplexing the first and second demodulated subset signals through a data demultiplexer.

10. (Currently Amended) An offset time tracking apparatus that tracks a time offset in a non-negligible multipath spacing environment, the apparatus comprising:

a first timing offset that provides an indication of a first modulated signal location;

a second timing offset that provides an indication of a second modulated signal location;

a first demodulator for demodulating the first modulated signal using a first data despreading sequence and the first timing offset to generate a first demodulated signal, wherein the first demodulator operates in an environment encompassing an antenna diversity system, the antenna diversity system comprising a plurality of antennas each transmitting a modulated signal, and wherein the first modulated signal is from a first transmit antenna from the plurality of antennas;

a second demodulator-for demodulating the second modulated signal using a second data despreading sequence and the second timing offset to generate a second demodulated signal, wherein the second demodulator operates in the environment encompassing the antenna diversity system and wherein the second data despreading sequence is different from the first data despreading sequence, and wherein the second modulated signal is from a second transmit antenna from the plurality of antennas;

means for generating a first error signal for the first demodulated signal, the means for generating coupled to the first timing offset and the first modulated signal;

means for generating a second error signal for the second demodulated signal, the means for generating coupled to the second timing offset and the second modulated signal;

a first time tracking loop coupled to the means for generating the first error signal, the first time tracking loop generating an updated first timing offset that is used for subsequent demodulation of the first modulated signal; and

a second time tracking loop coupled to the means for generating the second error signal, the second time tracking loop generating an updated second timing offset that is used for subsequent demodulation of the second modulated signal.

11. (Original) The apparatus of claim 10, further comprising a data demultiplexer coupled to the first and the second demodulated signals, the data demultiplexer combining the first and the second demodulated signals.

12. (Original) The apparatus of claim 10, wherein the means for generating the first error signal further comprises:

means for determining a prior energy level of the first demodulated signal a predetermined time prior to the first timing offset;

means for determining a subsequent energy level of the first demodulated signal a predetermined time subsequent to the first timing offset; and

means for combining the prior and the subsequent energy levels to generate the first error signal.

13. (Original) The apparatus of claim 10, wherein the means for generating the second error signal further comprises:

means for determining a prior energy level of the second demodulated signal a predetermined time prior to the second timing offset;

means for determining a subsequent energy level of the second demodulated signal a predetermined time subsequent to the second timing offset; and

means for combining the prior and the subsequent energy levels to generate the second error signal.

14. (Currently Amended) In a mobile station receiver, a method for offset time tracking in a non-negligible multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system, the antenna diversity system comprising a plurality of antennas each transmitting a modulated signal;

demodulating a first modulated signal of the plurality of modulated signals into a first demodulated signal in response to a first offset, a first data despreading sequence, and a first pilot estimate, wherein the first modulated signal is from a first transmit antenna from the plurality of antennas;

demodulating a second modulated signal of the plurality of modulated signals into a second demodulated signal in response to a second offset, a second data despreading sequence, and a second pilot estimate, wherein the second data despreading sequence is different from the first data despreading sequence, and wherein the second modulated signal is from a second transmit antenna from the plurality of antennas;

generating a first error signal for the first demodulated signal in response to sampling of a pilot signal, associated with the first modulated signal, a

predetermined time prior to the first offset and a predetermined time subsequent to the first offset;

generating a second error signal for the second demodulated signal in response to sampling of a pilot signal, associated with the first modulated signal, a predetermined time prior to the second offset and a predetermined time subsequent to the second offset;

generating a first updated offset in response to the first time error signal; and

generating a second updated offset in response to the second time error signal.

15. (Currently Amended) A method for offset time tracking in a non-negligible multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system, the antenna diversity system comprising a plurality of antennas each transmitting a modulated signal;

demodulating each of the plurality of modulated signals into a plurality of demodulated signals, each signal being demodulated using an offset, a data despreading sequence, and a pilot estimate, wherein the data despreading sequence is different for each of the plurality of modulated signals, and wherein each of the plurality of modulated signal is from a different transmit antenna from the plurality of antennas;

generating a plurality of error signals, one for each of the plurality of demodulated signals, each in response to sampling of a pilot signal associated with each

modulated signal a predetermined time prior to the offset and a predetermined time subsequent to the offset; and

generating a plurality of updated offsets, each in response to each of the plurality of time error signals.

16. (Original) The method of claim 15, wherein the antenna diversity system is a receive antenna diversity system.

17. (Currently Amended) A method for offset time tracking in a non-negligible multipath spacing environment, the method comprising:

receiving signals in an environment encompassing an antenna diversity system, the antenna diversity system comprising a plurality of antennas each transmitting a modulated signal of a plurality of modulated signals and having an associated pilot signal, wherein each of the plurality of modulated signal is from a different transmit antenna from the plurality of antennas;

generating a demodulated signal from a modulated signal of the plurality of modulated signals using an offset, a data despreading sequence, and a plurality of pilot signal estimates, wherein the data despreading sequence is different for each of the plurality of modulated signals;

generating an early despread signal for the demodulated signal in response to a sampling of an associated pilot signal prior to the offset and a pilot despreading sequence;

accumulating the early despread signal over a predetermined chip interval to generate a first symbol;

generating a first sum for the early despread signal that is made up of the first symbol and a delayed first symbol;

generating a second sum for the early despread signal that is made up of the first symbol and a negative of the delayed first symbol;

generating a first error signal in response to a sampling of the first and second sums for the early despread signal;

generating a late despread signal for the demodulated signal in response to a sampling of the associated pilot signal subsequent to the offset and the pilot despreading sequence;

accumulating the late despread signal over the predetermined chip interval to generate a second symbol;

generating a first sum for the late despread signal that is made up of the first symbol and a delayed first symbol;

generating a second sum for the late despread signal that is made up of the first symbol and a negative of the delayed first symbol;

generating a second error signal in response to a sampling of the first and second sums for the late despread signal;

generating an average error signal in response to a weighted sum between the first and second error signals; and

generating an updated offset in response to the average error signal.

18. (Original) The method of claim 17, wherein the predetermined chip interval is 256 chips.

19. (Original) The method of claim 17, wherein the sampling of the first and second sums for the early and late signals is performed at 512 chip intervals.

20. (Currently Amended) A mobile station receiver that is configured to offset time tracking in a non-negligible multipath spacing environment, the mobile station receiver comprising:

a processor;

memory in electronic communication with the processor;

instructions stored in the memory, the instructions being executable to:

demodulate a first modulated signal of the plurality of modulated signals into a first demodulated signal in response to a first offset, a first data despreading sequence, and a first pilot estimate, wherein the demodulation occurs in an environment encompassing an antenna diversity system, the antenna diversity system comprising a plurality of antennas each transmitting a modulated signal, and wherein the first modulated signal is from a first transmit antenna from the plurality of antennas;

demodulate a second modulated signal of the plurality of modulated signals into a second demodulated signal in response to a second offset, a second data despreading sequence, and a second pilot

estimate, wherein the demodulation occurs in the environment encompassing the antenna diversity system and wherein the second data despreading sequence is different from the first data despreading sequence, and wherein the second modulated signal is from a second transmit antenna from the plurality of antennas;

generate a first error signal for the first demodulated signal in response to sampling of a pilot signal, associated with the first modulated signal, a predetermined time prior to the first offset and a predetermined time subsequent to the first offset;

generate a second error signal for the second demodulated signal in response to sampling of a pilot signal, associated with the first modulated signal, a predetermined time prior to the second offset and a predetermined time subsequent to the second offset;

generate a first updated offset in response to the first time error signal; and

generate a second updated offset in response to the second time error signal.